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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/923,402 | 08/08/2001 | Minoru Shinohara | XA-9526 | 2375 |

181 7590 09/13/2002

MILES & STOCKBRIDGE PC
1751 PINNACLE DRIVE
SUITE 500
MCLEAN, VA 22102-3833

EXAMINER

PATEL, ISHWARBHAI B

ART UNIT PAPER NUMBER

2827

DATE MAILED: 09/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/923,402

Applicant(s)

SHINOHARA, MINORU

Examiner

Ishwar (I. B.) Patel

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: RED MARKED FIG. 2-6,

DETAILED ACTION

Claim Objections

1. Claim 9 is objected to because of the following informalities: "TSOP" should be spelled fully when used first time in the claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nicewarner, Jr. et al., US Patent 5,646,446, hereafter Nicewarner, in view of Frankeny et al., US Patent 5,229,916, here after Franking and Fernandez, US Patent 6,353,1888.

Regarding claims 1 and 16, Nicewarner discloses a semiconductor device in which a plurality of electronic components are mounted on a flexible substrate constituted by a flexible film with wiring formed thereon and the flexible substrate is folded and received within a case (flexible substrate 12 with electronic chips 18, see figure 30, except

a reinforcing pattern is formed in a bending portion of the flexible substrate and reinforcing patterns are also formed at end portions of a pair of electronic components mounting area, respectively, located on both side of the bending portion, and portions of

the flexible film present in gaps between the reinforcing pattern formed at end portions of the electronic components mounting areas are bent, whereby the flexible substrate is folded. However, where and how much reinforcing is to be provided will depend upon the type of substrate, weight and size of the component and the type of support and can be adjusted depending upon the specific requirement. Furthermore, Frankeny et al., discloses a flexible substrate with a gap exposing the substrate film in the bending region, see Frankeny figure 2 and 6, marked in red and Fernandez discloses the reinforcing trace around bending regions, see Fernandez figure 2. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit assembly of Nicewarner with the gap exposing a flexible substrate film in the bending region as taught by Frankeny and Fernandez, in order to have both enough flexibility in the bent region with the necessary support for the component.

Regarding claims 2 and 3, Nicewarner further discloses the wiring and the component are arranged axissymmetric with the bending portion as axis (see figure 4, wiring pattern 60 and 62 are axissymmetric to wiring pattern 64 and 66.

Regarding claims 4, 5 and 17, though Nicewarner does not discloses the reinforcing pattern surround the component mounting areas as claimed in claim 4 and cut out portions formed in the reinforcing patterns as claimed in claim 5 and 17, such design will depend upon the desired reinforcement necessary for the specific case and

further to provide a cut out instead of a continuous reinforcing is known in the art for the apparent reason of controlling the expansion contraction damage during heating cooling cycles. Furthermore, Fernandez discloses the reinforcement extended to surround the component with cut out, see Fernandez figure 2. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit assembly of Nicewarner with the reinforcing pattern surround the component mounting areas as claimed in claim 4 and cut out portions formed in the reinforcing patterns as claimed in claim 5 and 17, in order to have desired reinforcing with control expansion / contraction during heating / cooling cycles.

Regarding claim 6, the modified assembly of Nicewarner inherently discloses the reinforcing formed using the same material.

Regarding claim 7, the applicant is claiming the reinforcing patterns constitute a part of the power wiring, however the recitation that an element is used for performing a function or is capable of performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the reinforcing pattern of Nicewarner as a power wiring.

Regarding claims 8 and 9, Nicewarner further discloses an integrated circuit chip package in general, which can be any electronic device including a memory chip or a thin small outline package.

Regarding claim 10, Nicewarner further discloses the wiring on both the sides of the flexible film, see figure 3.

Regarding claim 11, though the modified assembly of Nicewarner does not explicitly disclose the wiring pattern on only one side of the substrate, it will depend upon the specific requirement and also depend upon the strength of the flexible film. Frankeny disclose the wiring pattern on one side, see Frankeny figure 6, wiring 30. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit assembly of Nicewarner with the bending portion of the flexible film with wiring only on one side thereof, in order to have enough mechanical strength of the flexible substrate in that specific requirements.

Regarding claims 12 and 13, the applicant is claiming a solder resist on surface of wiring and the reinforcing pattern. Though Nicewarner does not disclose the solder resist, the use of solder resist is known in the art for protecting the pattern and also to avoid short-circuiting during the soldering process. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit assembly of Nicewarner with solder resist on the wiring pattern and

the reinforcing pattern in order to protect the wiring pattern and the reinforcing pattern and to avoid short circuiting during soldering process.

Regarding claim 14, Nicewarner further discloses the flexible substrate folded in three layers (see figure 3).

4. Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Nicewarner, Frankeny and Fernandez as applied to claims 1-14 and 16 above, and further in view of Leyba, US Patent 3,873,889.

Applicant is claiming a socket attached to a longitudinal side face and passive components mounted in the vicinity of the socket. Though, Nicewarner does not disclose such socket and passive component, it is known to have a socket or a connector, socket with pins, for making connection with outside circuit or module and also known is the use of the passive component like resistor or capacitor for various specific functions. Leyba discloses a connector with passive component connected to the flexible substrate. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit assembly of Nicewarner with the socket and passive component for the functionality of the device.

Conclusion

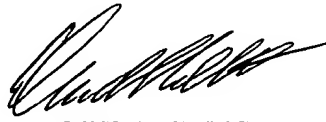
5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Smith, Matsumoto et al., Sera et al., Kim et al., Kruppa and Smith et al., disclose circuit board assembly similar to applicant's claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (6:30 - 4) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

ibp
September 8, 2002


DAVID L. TALBOT
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

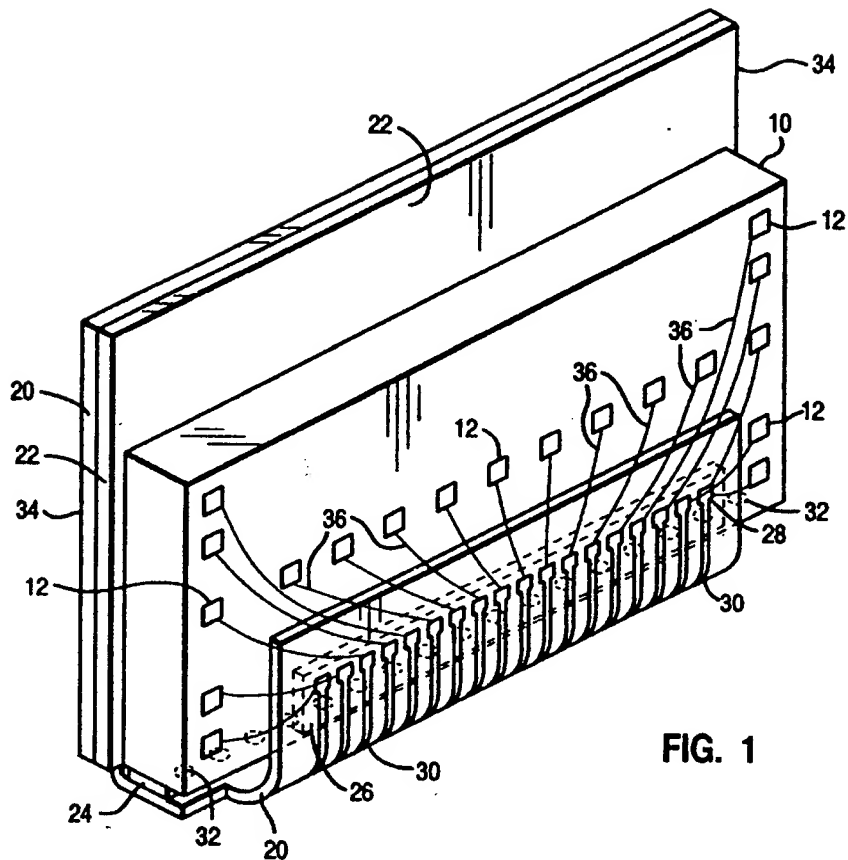


FIG. 1

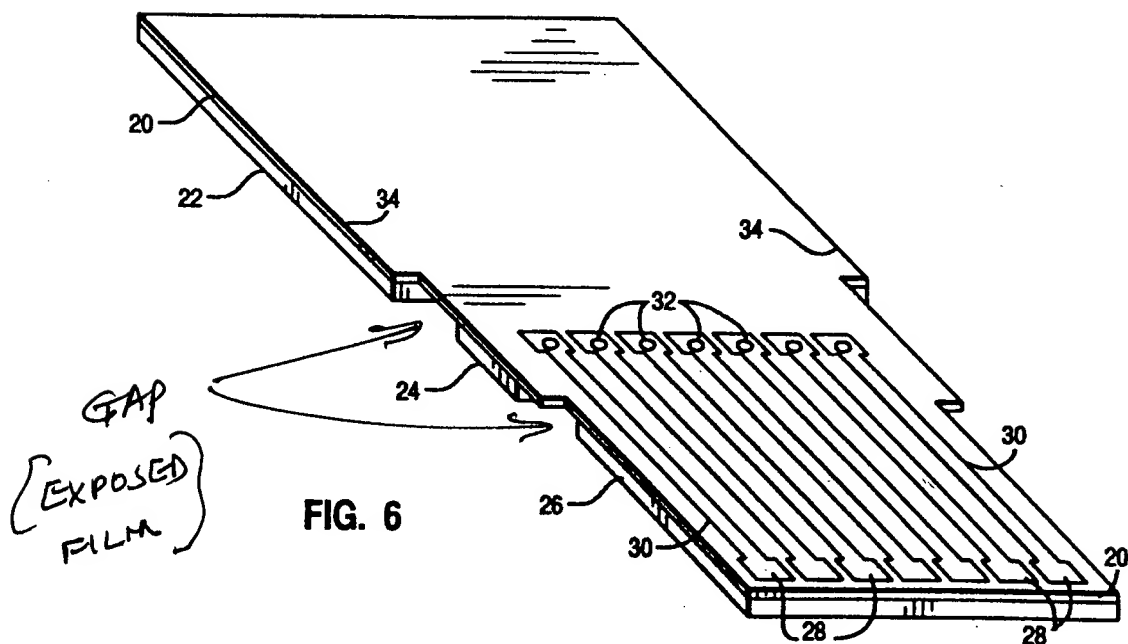


FIG. 6

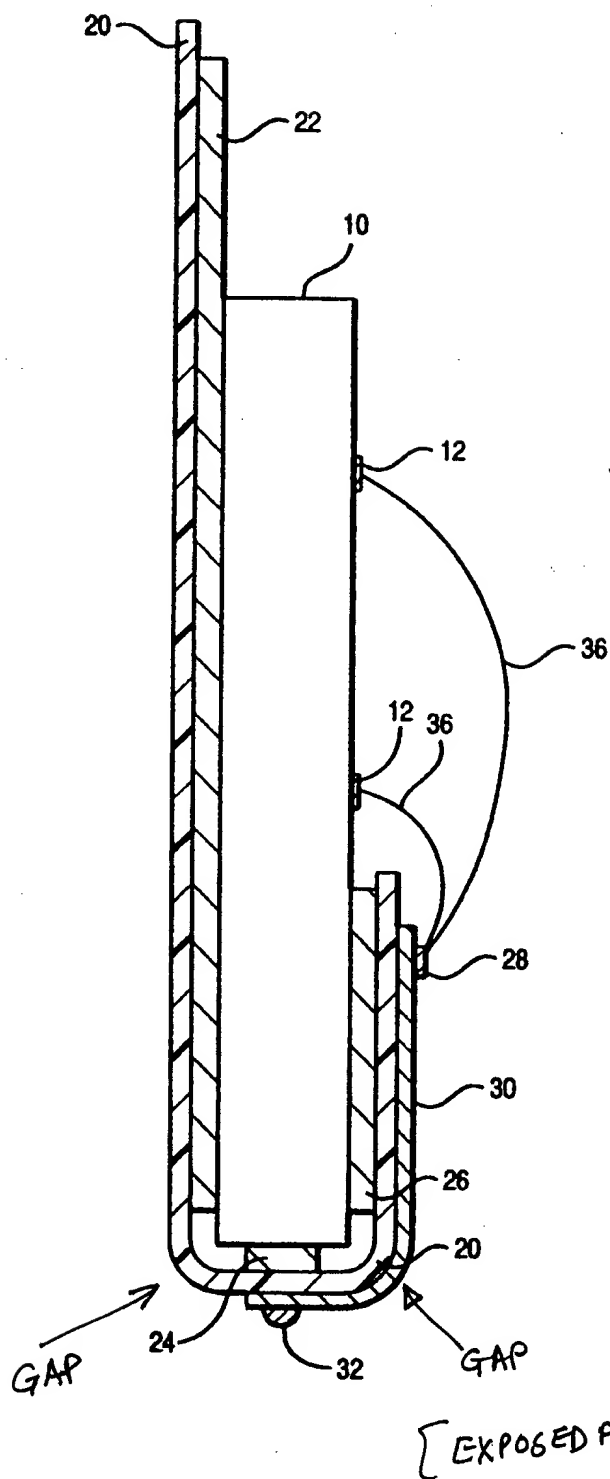


FIG. 2

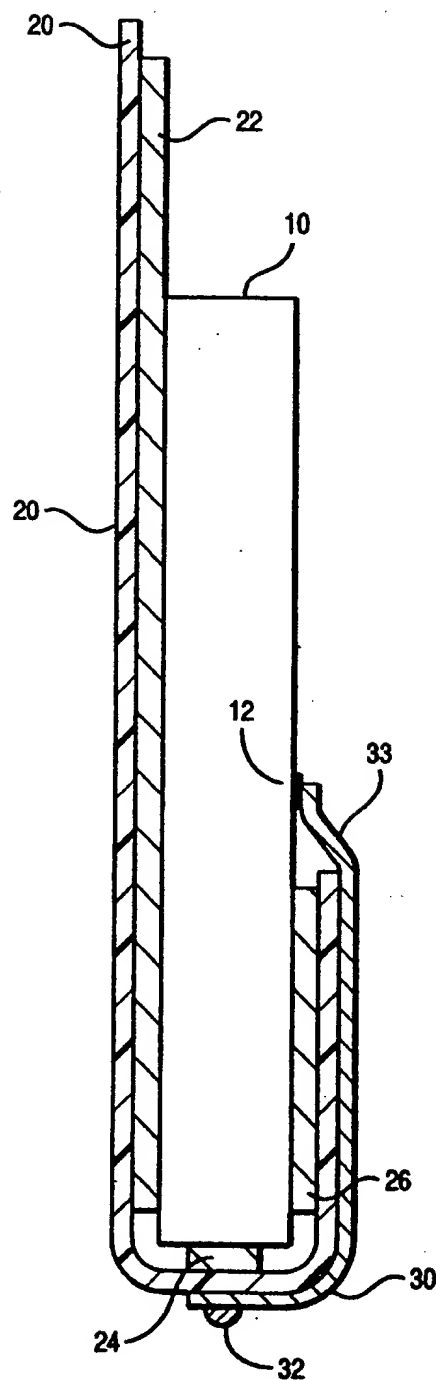


FIG. 9